Before the Federal Communications Commission Washington, DC 20554

In the Matter of)	
	j	
Inquiry Concerning the Deployment of)	GN Docket No. 12-228
Advanced Telecommunications Capabili	ity)	
To All Americans in a Reasonable and)	
Timely Fashion, and Possible Steps To	j	
Accelerate Such Deployment Pursuant)	
To Section 706 of the	j	
Telecommunications Act of 1996, as	j	
Amended by the Broadband Data	j	
Improvement Act	ĺ	

Comments of Public Knowledge

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SUMMARY AND INTRODUCTION

As has been noted by too many people in too many places to count, connectivity is increasingly critical to full participation in our society and economy. In light of that, Public Knowledge commends the Commission for its continued focus on broadband deployment. Public Knowledge is further encouraged that the Commission has recognized that data capacity thresholds play a role in the usefulness of connectivity.

At this point, data capacity thresholds impose clear costs on consumers and the public. Unfortunately, their benefits are less clear. Before the Commission can make responsible decisions about data capacity thresholds, it must first understand and evaluate the reasons that thresholds are being imposed in the first place.

ARGUMENT

I. Understanding Data Capacity Thresholds is Critical to Developing a Complete Understanding of the State of Broadband Deployment

Measuring broadband deployment is not as simple as merely determining which households can connect to the internet. It is the nature of the connection that determines if the access meaningful. That is why the Commission evaluates speed in this proceeding, and why it is considering evaluating latency and data capacity as well.

Data capacity is especially important to this analysis, and especially easy to overlook. Eye-popping advertised download speeds are of little value when

capacity limits prevent consumers from using them. AT&T's U-verse offers speeds of up to 24 Mbps,¹ and a cap of 250 GB per month.² At that speed, a consumer could hit her monthly limit in less than one day. Wireless limits are even more constricting. Verizon's much ballyhooed 4G wireless network promises speeds of up to 12 Mbps,³ but pushes users towards a 2 GB cap. At advertised speeds, a user could burn through that is less than a half hour.⁴ Even if a user is wiling to spend \$150 per month (plus \$40 per month for access) for Verizon's largest data plan (20 GB per month), she could exceed her monthly threshold in less than 4 hours.

Focusing on speed of connection alone would overlook these restrictions, and therefore could greatly overestimate the utility of a broadband connection.

Consumers will see very little value from broadband access services with speeds that can support applications such as real-time video telephony or streaming video if capacity limits make actually using those services prohibitively expensive. In order to realistically evaluate broadband deployment, the Commission must first develop a more detailed understanding of the impact of capacity limits on consumers. In large part due to a lack of transparency on the part of ISPs, at this point that impact is inadequately understood.

II. Capacity Limits Have Costs

4 *Id*.

¹ http://www.att.net/speedtiers

² Karl Bode, *AT&T Caps Have Arrived*, DSLReports.com, May 2, 2011, http://www.dslreports.com/shownews/ATT-Caps-Have-Arrived-114012.

³ Michael Weinberg, *4G + Data Caps = Magic Beans* at 7 (Public Knowledge, Aug. 2011) http://www.publicknowledge.org/4g-data-caps-magic-beans.

While capacity limits can be used by ISPs to achieve legitimate goals,⁵ it is critical to remember that such limits impose costs on consumers and society. Evaluating capacity limits requires balancing these costs against the purported benefits.

A. Capacity Limits Create a Disincentive to use Broadband

As Chairman Genachowski recently recognized, perhaps the most obvious cost of capacity limits is that they create a disincentive to use broadband.⁶ Congress' interest in broadband deployment is not academic. Broadband should not be deployed merely in order to allow Americans to say that the entire country is connected to the internet. Deployment and access are important because of what people do once they are connected to the internet. Severely restricting the utility of deployed broadband access by imposing strict capacity limits undermines the very reason to support broadband deployment in the first place. Dreams of broadband-fueled education, healthcare, energy and the environment, civic engagement, and public safety applications⁷ can be dashed on the rocks of restrictive capacity limits.

No matter the limit's threshold, the very existence of a capacity limit can stand as a disincentive to use broadband. In large part this is because average consumers do

⁵ See generally, Andrew Odlyzko, et al., *Know Your Limits: Considering the Role of Data Caps and usage Based Billing in Internet Access Service* (Public Knowledge, May 2012) http://www.publicknowledge.org/know-your-limits-considering-role-data-caps-and-us.

⁶ See, Stacy Higginbotham and Janko Roettgers, FCC Chairman: I'm concerned about data caps, GigaOM, Sep. 11, 2012, http://gigaom.com/2012/09/11/fcc-chairman-im-concerned-about-data-caps/.

⁷ See, FCC, Connecting America: The National Broadband Plan (2010).

not understand how data consumption is measured, or how much data a given activity requires.

This confusion is understandable. Limits are often expressed in gigabytes (GB) per month. However, the data consumption of many streaming services is expressed in megabits per second (Mbps). Furthermore, those streaming rates can be both hard to find and subject to a wide degree of variation. Most streaming services use dynamic or adaptive streaming that changes in response to network conditions. As a result, even the same movie streamed over the same network to the same hardware can use different amounts of data. It provides little comfort that the two largest wireless carriers, AT&T and Verizon, disagree as to how much data streaming video requires – or that their estimate is almost half that of Netflix's real world experience.⁸ Netflix's real world performance metrics also illustrate how hard it can be to estimate data usage on a wired network, with rates varying widely from day to day on any given provider, as well as from provider to provider.⁹

The preceding paragraph referenced the measurements gigabits per month, megabits per second, kilobits per second, and megabits per hour in a discussion limited to streaming video – only one of many activities available to a consumer with a broadband internet connection. It is simply not realistic to expect consumers

⁸ AT&T estimates that it requires 300 MB per hour, while Verizon puts the number at 350 MB per hour. *See* Clarissa Ramon, *Jump Over the Gap and Stay Under the Cap*, Public Knowledge Policy Blog, Aug. 15, 2012,

http://www.publicknowledge.org/blog/jump-over-gap-and-stay-under-cap. In contrast, Netflix reported 4G streaming at approximately 1,400 Kbps, or approximately 630 MB per hour. *See* Ken Florance, *Netflix Performance on Top ISP Networks*, The Netflix Tech Blog, Jan. 27, 2011

http://techblog.netflix.com/2011/01/netflix-performance-on-top-isp-networks.html.

⁹ *Id*.

to understand each of these metrics, let alone possess the capacity to easily calculate the relationships between them. How many people know that 8 bits are in a byte, and can easily convert from one to another? How many consumers know that a gigabyte sometimes refers to 1,000 bytes, and sometimes to 1,024 bytes? When faced with high penalties for exceeding capacity limits, it should come as no surprise that most consumers will err on the side of underusing their broadband connection.

Furthermore, capacity limits can impose costs on consumers who are nowhere near exceeding them. The mere switch from unlimited to metered plans imposes new mental accounting costs on all consumers. ¹⁰ In some cases, these costs are so significant that consumers prefer higher priced unlimited plans to metered plans that could ultimately save them money. ¹¹

B. Capacity Limits Can Undermine Competition

One of the most compelling aspects of digital data transfer is how it has collapsed formally separate categories of services. Where a generation ago voice service was distinct from video service (which were both distinct from the services provided by a newspaper or the postal service), today all of these services can be delivered over a single broadband connection. While this is a benefit to society at large, it undermines business models designed to charge consumers once for video

¹⁰ See, Know Your Limits 41- 46.

¹¹ See. id. at 45.

service, a second time for voice service, and potentially a third time for general data services.

A company that controls broadband access and profits from charging consumers for video, voice, and data separately has an economic incentive to leverage that broadband access control to protect its other revenue streams. Merely replacing cable television with an internet-delivered high-definition video competitor would require between 550 and 650 GB per month of data. As the Commission noted in its *Notice of Inquiry*, this is well above the capacity thresholds set by both AT&T and Comcast. Both AT&T's U-verse and Comcast's cable internet access service offer speeds that can support high definition video streaming, but both have set their capacity threshold at a level that would prevent a consumer from replacing their respective pay television offering with an internet-delivered competitor.

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¹² See, Preserving the Open Internet, GN Docket No. 09-191; Broadband Industry Practices, WC Docket No. 07-52, "Report and Order," FCC 10-201 (Dec. 23, 2010) at ¶ 11, 37-38; Application of Comcast Corporation, General Electric Company and NBC Universal, Inc. For Consent to Assign Licenses and Transfer Control of Licenses, MB Docket No. 10-56, "Memorandum Opinion and Order" (Jan. 20, 2011) at ¶ 3, 93. See also, Competitive Impact Statement of the United Sates, et al., United States v. Comcast Corp., (D.C. Cir. 2011) at pp. 11, 37-38, http://www.justice.gov/atr/cases/f266100/266158.htm.

¹³ The variability can be traced to, among other things, the method used to stream the video. Replacing cable television with HD programming streamed at a rate calculated by Comcast would require 648 GB per month. Using the rate used by Netflix, the same amount of video would require 552 GB per month. *See* Public Knowledge, *Petition to Enforce Merger Conditions*, MB Docket No. 10-56 (Aug. 1, 2012) ("PK Comcast Complaint").

¹⁴ Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, GN Docket No. 12-228, "Ninth Broadband Progress Notice of Inquiry," FCC 12-91 (Aug 21, 2012) at 18.

¹⁵ Id.

This spring, Comcast vividly illustrated the ways in which capacity thresholds can be used anticompetitively. Every online video offering a Comcast consumer enjoys on her Xbox 360 counts against that consumer's data capacity threshold – except the online video offering provided by Comcast. This immediately gives the Comcast option a real advantage over all unaffiliated competitors – an advantage that is only possible because Comcast owns both the online video service and the network used to deliver video to consumers.

Similarly, AT&T has considered a plan that would use data capacity limits to insert itself into its consumers' app purchases. After imposing a low data cap on its consumers, AT&T announced that it may allow app developers to pay to become exempt from the cap.¹⁷ This gives app developers a stark choice: tithe a portion of their revenue to AT&T to assure that their apps work or risk consumers racking up overage fees. That structure grants developers willing to pay AT&T – not necessarily developers with the best apps – an advantage in the marketplace.

C. Capacity Limits Can Create a Disincentive to Invest in Networks

The national priority of increased broadband deployment can be directly and negatively impacted by capacity limits. This is because ISPs are not only moving

¹⁶ See, PK Comcast Complaint.

¹⁷ Anton Troinovski, *AT&T May Try Billing App Makers*, The Wall Street Journal, Feb. 28, 2012,

http://online.wsj.com/article/SB10001424052970204653604577249080966030276.html.

towards imposing capacity limits on consumers – they are also moving towards imposing financial penalties on consumers who exceed the limits.

These limits create at least two disincentives towards continued network investment. First, as they tend to be static and slow to adjust, ¹⁸ capacity limits can freeze broadband usage patterns. Users are reluctant to experiment with cutting-edge, advanced services if they are worried that incorporating those services into their daily lives will cause them to run afoul of their limits. Limits geared towards "normal" usage in 1999 would have frozen data usage at levels that assumed most people used the internet primarily for the "killer application" of email. ¹⁹ In 2005, that same assumption would have prevented many of today's everyday internet activities – like streaming videos, interacting with graphically rich and dynamic web services, and cloud storage and computing – from ever becoming widespread. Historically, today's cutting edge behaviors are tomorrow's everyday activities. However, capacity limits that make cutting edge behaviors prohibitively expensive break that adoption pattern.

Second, because capacity limits allow ISPs to monetize scarcity, they create a perverse incentive to delay network improvements that might allow capacity limit increases. If an ISP that imposes capacity limits on consumers invests in its own network, it is effectively spending money in order to reduce the amount of income it receives from overage charges.

¹⁸ For example, Comcast's recent increase to its data limit was the first such increase since the limit was imposed in 2008.

¹⁹ National Telecommunications and Information Administration, *Falling Through the Net: Defining the Digital Divide*, 40 (1999), http://www.ntia.doc.gov/legacy/ntiahome/fttn99/contents.html.

III. Capacity Limits' Purpose or Benefits are Unclear

With the exception of generating fees for ISPs, it is unclear what purpose current capacity limits are designed to achieve. Monthly data capacity limits are blunt tools to address network congestion and are ineffective price signals to consumers. As a result, capacity limits impose costs on consumers with little discernable benefit.

A. Monthly Capacity Limits do not Address Network Congestion

By its very nature, network congestion occurs at a specific place in the network at a specific time. This makes monthly capacity limits an incredibly inefficient way to address concerns related to congestion.

At its simplest, this is because monthly capacity limits do not take the state of the network into account. Streaming a high definition movie at 8 pm on a Wednesday is much more likely to contribute to network congestion than remotely backing up data at 3 am on a Sunday. Unfortunately, monthly capacity limits treat both of these activities the same. Furthermore, there is no indication that imposing a monthly capacity limit on consumers reduces usage during times of peak congestion, or shifts activities away from times of peak congestion towards times of lower network load. This should come as no surprise – a monthly data cap provides no incentive for consumers to shift their usage pattern. The only incentive they offer is to use less data overall.

B. Monthly Capacity Limits are Ineffective Price Signals

Although they are nearly useless as tools to address network congestion, one might imagine that capacity limits could serve a role in service differentiation and price discrimination. Unfortunately, since capacity limits are poorly understood by the public, they are inefficient signals to consumers who may place a higher-than-average value on connectivity.

Price signals are only effective if consumers understand them. As described above, ²⁰ understanding how the data usage for different activities can relate to a monthly capacity limit can be challenging. Furthermore, the signal that a consumer has exceeded her monthly limit can be remote from the decision to engage in the data-intensive activity. It could take weeks before a consumer who decided to stream high definition video receives a bill indicating that she exceeded her monthly data capacity limit. At that point, she has no effective way to identify which activities are driving her towards the limit, let alone consider how highly she values those activities.

These shortcomings are thrown into stark relief when monthly capacity limits are compared to another price discrimination tool: data speed. In contrast to monthly capacity limits, data speeds provide users immediate feedback that the activity they are engaged in may require paying more for a faster broadband connection. A user confronted with buffering video (a signal that almost all internet users understand as related to connection speed) can evaluate at that moment how

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²⁰ See section II.A.

much she values video streaming and whether it is worth paying for a faster connection to enable such activities. Under monthly limits, that same consumer must wait until the end of the month, potentially pay overage fees, try and remember what she could have done to exceed her limit, and decide if that activity was worthwhile at the time.

IV. There is No Simple Way to Determine What Constitutes a "Reasonable" Data Capacity Threshold

In order for the Commission to adopt a data capacity threshold, it must fist determine if the data capacity thresholds that exist today should be recognized as legitimate. Currently available information makes that analysis impossible, and Public Knowledge commends the Commission for beginning to ask simple questions that will elicit some of the information required to engage in an informed analysis. Consumers' actual use, and the impact that a capacity threshold has on that use, is poorly understood outside of the offices of ISPs. Only ISPs truly understand how often consumers exceed their limits and what type of circumstances trigger that excess. Without that information it is impossible for the FCC to come to an informed conclusion as to what might constitute a reasonable data capacity threshold. The Commission cannot simply trust that ISPs are implementing data capacity thresholds in a responsible manner.

It is unlikely that simple benchmarking will provide meaningful insight into the process of adopting a threshold. Many Americans have few choices for truly high-speed broadband internet access. As a result, ISPs are not regularly forced to

respond to the type of market pressure that would cause them to make adjustments to their thresholds. Looking to thresholds set by local monopolist or duopolist ISPs as guidance will be of limited utility.

In order to begin to consider the role that data capacity thresholds play in the deployment of advanced telecommunications services, the Commission must begin to ask simple questions it has thus far been unwilling to raise.²¹ Why do ISPs impose thresholds? How are individual thresholds set? Once set, how are the thresholds evaluated against their purported purpose? What conditions would cause the thresholds to change? Without answers to these questions, any threshold adopted by the Commission would be as arbitrary as those adopted by individual ISPs.

CONCLUSION

Public Knowledge commends the Commission for beginning to investigate data capacity limits. Hopefully, this *Notice* marks the beginning of a process to fully understand the role that capacity limits are playing in the way that consumers access the internet.

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²¹ See, e.g. Letter from Future of Music Coalition, New America Foundation's Open Technology Initiative, and Public Knowledge to Julius Genachowski, Chairman, Federal Communications Commission (July 14, 2011),

http://www.publicknowledge.org/letter-fcc-regarding-data-caps; Letter from Public Knowledge and New America Foundation's Open Technology Initiative to Sharon Gillett, Chief, Wireline Competition Bureau, Federal Communications Commission (May 6, 2011), http://www.publicknowledge.org/letter-to-FCC-on-ATT-Data-Caps.

Respectfully Submit	ted,
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